

WBS 1.8 – Water Cooling System

Russ Grandinetti

July 25-27, 2005

- Major procurements: Design and Fabrication
 - Components for 3 Pump Skids
 - EBIS 1-4 – Collector & LINAC Quad Magnets
 - EBIS 2-5 – High Voltage Platform
 - EBIS 3 – RFQ & LINAC System
 - Water Cooling PLC System
 - Cost Basis – Similar Items, Engineering Judgment
- Deliverables:
 - 3 Pump Skids
 - Water Cooling PLC System
- Installation Covered Under WBS 1.10.8

WBS 1.8 Cooling System Requirements

EBIS 1-4 System 30 HP

Electron Collector/Quads	Collector	Linac quads	System
Flow	40 gpm	20 gpm	60 gpm
Supply Pressure	425 psi (note 1)	375 psi	425 psi
Heat Load	200 kW	1 kW	201 kW
Inlet Supply Temp	70 F (21C)	85 F (30C)	70 F (21 C)
Water Treatment	DI at <10 uS/cm or 0.1 MegOhms/cm		
Req'd Floor Area	70 ft ² excluding required aisle or wall space for electrical equipment		

EBIS 2-5 System 15 HP

High Voltage Platform / RF amplifiers / Circulators				
	Platform	RF Amplifiers	Circulator	System
Flow	60 gpm	70 gpm	5 gpm	135 gpm
Pressure	60 psi (note 2)	80 to 100 psi	80 psi	90 psi
Heat Load	60 kW	100 kW	5 kW	165 kW
Inlet Supply Temp	70 F (21C)	85 F (30C)	85 F (30C) +/- 1F	70 F
Water Treatment	DI at <10 uS/cm or 0.1 MegOhms/cm			
Req'd Floor Area	70 ft ² excluding required aisle or wall space for electrical equipment			

EBIS 3 System 5 HP

RFQ & Linac			
Flow	20 gpm		
Pressure	100 psi	5 HP estimated	
Heat Load	7 KW		
Inlet Supply Temp	70 F (21C) +/- 1F		
Water Treatment	Water additive 4109, iron corrosion inhibitor		
Req'd Floor Area	50ft ² excluding required aisle or wall space for electrical equipment		

Typical Pump System



Typical Water PLC System



WBS 1.8 Cooling Systems

- Estimated Cost

WBS	Description	Direct FY'05K\$			
		Mat'l	Labor	Contingency	Total
1.8	Cooling Systems	195	40	\$50 (21%)	285

- Labor hours/equivalents

Resource Category	estimated hours
Engineer	150
Designer	325
Technician	175
Total	650
Full Time Equivalents	0.4